REMARKS

Amendments to the Claims

Claims 1 has been amended to make its metes and bounds more distinct and definite.

Claims 6-12 have been withdrawn as per the election filed December 30, 2005.

Claims 13 -15 are new. Support is provided by original claim 1 (for new claims 13 and 14) and at page 5, lines 24-28 and page 8, lines 21-24 (for new claim 15).

Present Invention

The present invention is directed to a process for the production of frozen fruit or frozen fruit bits (such as those present in fruit salads and toppings) that have a much better flavor and softer, more natural texture when eaten in the frozen state.

Applicants' process involves under-cooling fruit to a specified temperature range below the freezing point (e.g., -6 ° C to -15° C) combined with further reduction in temperature to form ice crystals. Applicants' surprisingly discovered that the under-cooling rate need not be super-slow provided the rate is sufficient to achieve under-cooling in the specified temperature range. This discovery makes the process for making improved frozen fruits (fruits that actually contain ice crystals) both efficient and practical on an industrial scale.

Claims Rejection under 35 USC §112

Claims 1-5 were rejected under 35 USC §112 second paragraph as being indefinite because they recited both a broad and narrow range for the same limitation. Applicants have amended claim 1 to recite only one under-cooling rate range and respectfully request that the 35 USC §112 second paragraph rejection be reconsidered and withdrawn.

Claims Rejection under 35 USC §103

Claims 1-5 were rejected under 35 USC 103(a) as being unpatentable over Yamane et al (EP 0,815,746 A1) in view of Reynolds (How Freezing Affects Food). Applicants' respectfully traverse this rejection based on the following analysis.

Yamane et al. is primarily directed to a method of preserving foods in a non-frozen state in prolonged storage by employing a "super-slow cooling treatment" (term actually used by Yamane et al., see page 4, line 39-40). The treatment involves cooling below the normal freezing point of the food at a cooling rate between 0.1 ° C/hr and 0.5 ° C/hr, preferably 0.1 ° C/hr to 0.4 ° C/hr (page 3, line 36, and page 4, line 57).

Yamane et al. discloses in Example 10 (page 13, lines 31-39) that this super slow cooling treatment can be combined with equilibration of the fruit for two weeks in the non-frozen state followed by further rapid cooling to below -18 ° C.

The Office asserts that it would have been obvious for one of ordinary skill in the art to have utilized the higher cooling rate claimed by applicants as evidenced by Reynolds that teaches that the extent of cell wall rupture can be controlled by freezing products "as quickly as possible". Applicants respectfully disagree.

Yamane et al is very specific about the required cooling rate, stating on page 5, lines 6-10:

"Furthermore, investigation on the part of the inventors has revealed that when the above-mentioned slow cooling treatment conditions and process are not employed, that is, when a slow cooling treatment involving cooling at a gradual rate of 0.01 to 0.5 "C hour to below the freezing point is not performed, it is difficult to maintain a food or the like in a non-frozen state in the temperature zone below the freezing point, and the stated objects cannot be achieved. "

Thus, according to Yamane et al, the invention would become inoperative if the cooling rate were not in the recited range of 0.01 to 0.5°C/hr.

In contrast, applicants' process is not concerned with prolonged storage in the under-cooled, non-frozen state. The under-cooling rates found by applicants that are sufficient to ultimately yield improved frozen fruits (fruits that contain ice crystals) are 4-600 times higher than the maximum recommended rate of Yamane et al.

Applicants' respectfully submit that a person of ordinary skill in the art reading Yamane et al would not have explored under-cooling rates in the range employed by applicants' because Yamane et al specifically teaches against such a modification.

Reynolds teaches that foods should be frozen as quickly as possible: a condition diametrically opposed to the teachings of Yamane et al. Moreover, Reynolds does not mention under-cooling let alone under-cooling to a specified temperature range.

In contrast applicants' process requires under-cooling to a temperature in the range of -6° C to -15° C at a rate in the range of 2 to 320 ° C/hr.

Applicants' respectfully draw the Examiner's attention to Comparative Examples 1-3 where fruits were frozen in a commercial "blast freezer", an accepted common variant of Reynolds' "freezing as quickly as possible". Applicants have shown that freezing fruits in a commercial blast freezer is insufficient to achieve under-cooling by more than about 1°C below the freezing point and does not provide a temperature difference between the core and the surface of the fruits that is 1.5° C or greater (page 4, lines 6-10).

The frozen fruit pieces prepared in the blast freezer were judged to have inferior flavor and much harder texture than fruits prepared according to the present invention employing an under-cooling rate of 2.5°C/hr. (Examples 4-6). These results are very surprising in view of the teachings of both Yamane et al and Reynolds because the under-cooling rate used in examples 4-6 is dramatically higher (5 times) than the maximum permitted rate according to Yamane et al and dramatically lower than the "as fast as possible" cooling rate recommended by Reynolds (essentially a blast freezer).

In summary, applicants submit that without the benefits of hindsight, the invention recited in claim 1 would not have been obvious to a person of ordinary skill in the art reading Yamane et al and Reynolds. A person of ordinary skill in the art would not have been motivated to combine the cited references because each is essentially mutually exclusive regarding cooling rates and each teaches away from the

modifications that would have had to have been made to arrive at applicants' claimed invention.

Claims 2 and 13-15 are even further removed from Yamane et al.

Claim 2 recites carrying out the under-cooling process at a cooling rate that provides a temperature difference between the core and the surface of the fruits of less than 1.5° C. Both Yamane et al and Reynolds are silent about temperature differentials between the surface and core of fruits during under-cooling and its potential importance to the properties of the fruit in the frozen state.

Claim 13 and 14 recite minimum cooling rates that are 20 to 80 times higher than the maximum cooling rate taught by Yamane et al.

Claim 15 recites the limitation wherein 50% by number of the frozen fruit bits have a fracture force of less than 0.01 kN. Yamane et al and Reynolds are silent about fracture force in the frozen state and any such limitation impacting the selection of the conditions employed in the process.

In view of the foregoing amendment and remarks, applicants respectfully request that the 103(a) rejection over Yamane et al (EP 0,815,746 A1) in view of Reynolds (How Freezing Affects Food) be reconsidered and withdrawn and that the application be allowed to issue.

If a telephone conversation would be of assistance in advancing prosecution of the subject application, applicants' undersigned agent invites the Examiner to telephone him at the number provided.

Respectfully submitted,

Michael P. Aronson
Registration No. 50, 372
Agent for Applicant(s)

(201) 894-2412